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Title: Discrete algorithms (plus some machine learning) can help biologists construct the Tree of Life!

Abstract: Constructing the Tree of Life is a Scientific Grand Challenge but also one that presents many fascinating problems for algorithms designers. In this talk, I will present research from my group where new PhD students could find interesting projects. Some of this work is in developing novel machine learning methods, and others use graph-theoretic and discrete algorithms. One specific new research area is genome-scale phylogeny estimation, addressing heterogeneity between gene trees and species trees due to incomplete lineage sorting (ILS) and gene duplication and loss (GDL). For GDL-based species tree estimation, I will present some unpublished work, joint with my student Erin Molloy.